
Appendix I: Scope and Methodology

To respond to the first objective of this report—examine the impact of competition on cable rates—we used an empirical model (our cable-satellite model) that we previously developed that examines the effect of competition on cable rates and services.¹ Using data from the Federal Communications Commission’s (FCC) 2001 cable rate survey, the model considers the effect of various factors on cable rates, the number of cable subscribers, the number of channels that cable operators provide to subscribers, and direct broadcast satellite (DBS) penetration rates for areas throughout the United States. We further developed the model to more explicitly examine whether varied forms of competition—such as wire-based, DBS, multipoint multichannel distribution systems (MMDS) competition—have differential effects on cable rates. See appendix IV for a further discussion of this model. In addition, we spoke with an array of industry stakeholders and experts (see below) to gain further insights on these issues.

The second objective of this report consists of two parts. To respond to part one—assess the reliability of the cost justifications for rate increases provided by cable operators to FCC, we conducted a telephone survey (our cable franchise survey), from January 2003 through March 2003, of cable franchises that responded to FCC’s 2002 cable rate survey (see app. II). We drew a random sample of 100 of these cable franchises; the sample design was intended to be representative of the 755 cable franchises that responded to FCC’s survey. We used data from FCC, and conversations with company officials, to determine the most appropriate staff person at the franchise to complete our survey. To ensure that our survey gathered information that addressed this objective, we conducted telephone pretests with several cable franchises and made the appropriate changes on the basis of the pretests. We asked cable franchises a series of open-ended questions regarding how the franchise staff calculated cost and noncost factors on FCC’s 2002 cable rate survey, how well the franchise staff understood what FCC wanted for those factors, and franchise staff’s suggestions for improving FCC’s cable rate survey. All 100 franchises participated in our survey, for a 100 percent response rate. In conducting this survey, we did not independently verify the answers that the franchises provided to us.

¹See U.S. General Accounting Office, *Telecommunications. Issues in Providing Cable and Satellite Television Services*, GAO-03-130 (Washington, D.C. Oct. 15, 2002).

Additionally, to address part two of the second objective—assess FCC’s classifications of effective competition—we examined FCC’s classification cable franchises regarding whether they face effective competition. Using responses to FCC’s 2002 cable rate survey, we tested whether the responses provided by cable franchises were consistent with the various legal definitions of effective competition, such as the low-penetration test. Further, we reviewed documents from FCC proceedings addressing effective competition filings and contacted franchises to determine whether the conditions present at the time of the filing remain in effect today. We also reviewed filings for effective competition that were based on DBS subscribership to assess how data from SkyTRENDS are used in these filings.

To address the third, fourth, fifth, and sixth objectives (examine reasons for recent rate increases, examine whether ownership relationships between cable networks and cable operators and/or broadcasters influence the level of license fees for the cable networks or the likelihood that a cable network will be carried, examine why cable operators group networks into tiers rather than sell networks individually, and discuss options to address factors that could be contributing to cable rate increases), we took several steps, as follows:

- We conducted semistructured interviews with a variety of industry participants. We interviewed officials and obtained documents from FCC and the Bureau of Labor Statistics. We interviewed 15 cable networks—12 national and 3 regional—from a listing published by the National Cable and Telecommunications Association (NCTA), striving for a mixture of networks that have a large and small number of subscribers and that provide varying content, such as entertainment, sports, music, and news. We interviewed 11 cable operators, which included the 10 largest publicly traded cable operators and 1 medium-sized, privately held cable operator. In addition, we interviewed the four largest broadcast networks, one DBS operator, representatives from three major professional sports leagues, and five financial analysts that cover the cable industry. Finally, we interviewed officials from NCTA, Consumers Union, the National Association of Broadcasters, the National Association of Telecommunications Officers and Advisors, the American Cable Association, the National Cable Television Cooperative, and the Cable Television Advertising Bureau.
- We solicited the 11 cable operators we interviewed to gather financial and operating data and reviewed relevant Securities and Exchange Commission filings for these operators. Nine of the 11 cable operators

provided the financial and operating data we sought. We also acquired data from Kagan World Media,² which is a private communications research firm that specializes in the cable industry. These data provided us with revenue and programming expenses for over 75 cable networks.³

- We compared the average license fees among three groups of networks: those that are majority-owned by a broadcaster, those that are majority-owned by a cable operator, and all others. We performed t-tests on the significance of these differences. We also ran a regression (our cable license fee model) in which we regressed the license fee across 90 cable networks on the age of the network, the advertising revenues per subscriber (a measure of network popularity), dummy variables for sports and news programming, and a variety of factors about each franchise.
- We conducted several empirical tests on the channel lineups of cable operators as reported to FCC in its 2002 cable rate survey. We developed an empirical model (our cable network carriage model) that examined the factors that influence the probability of a cable network being carried on a cable franchise, including factors such as ownership affiliations and the popularity of the network. This model is discussed in greater detail in appendix V. Further, we developed descriptive statistics on the characteristics of various tiers of service and the channels included in the various tiers.

²Kagan World Media, *Economics of Basic Cable Networks 2003* (Carmel, CA 2003).

³Due to the confidential requirement of industry contracts, we could not independently verify the data from Kagan World Media. To assess the reliability of these data, we asked cable networks that we interviewed about the Kagan data. Eight of the 12 national cable networks we interviewed said that Kagan data on license fees, revenues, and programming expenses were fairly accurate.

Appendix II: GAO Survey of Cable Franchises

GAO Telephone Interview Template

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Entered by _____ Date _____

Verified by _____ Date _____

Community Unit Identification (CUID) Number:
Franchise and Parent Company:
Cable Company Survey Contact:
Date of Interview:

According to FCC's 2002 Cable Price Survey, you submitted the figures included in the last column of the table below. We will be referring to this table in our questions.

Row Monthly Charges for Programming Services July 1, 2002

51	Year-to-date change in monthly charge on row 50	
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Allocate the year-to-date change in monthly charge for cable television by estimating the dollars and cents that each factor, below, contributed.

Row July 1, 2002

52	License or copyright fees, <i>existing</i> programs	
53	License or copyright fees, <i>new</i> programs	
54	Head-end or distribution facility investment	
55	General inflation, not included elsewhere	
56	Other cost changes (positive or negative)	
57	Non-cost related factors (positive or negative)	
58	Total of rows 52-57 (must equal row 51)	

- 1 Does the data in the table accurately reflect the information you submitted to FCC?
- ☐ Yes
☐ No *[please explain the differences]*

- 2 At what level of your company was the information for this section of FCC's survey compiled?
- Was it completed...
- ☐ Primarily at the headquarters MSO level?
☐ Primarily at the regional MSO level?
☐ Primarily at the franchise/system level?
☐ Or A combination of levels?

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3 Briefly describe how you calculated each of the factors. For those factors to which you did not allocate any of your change in monthly charges, please describe why

- (52) License or copyright fees, *existing* programs

- (53) License or copyright fees, *new* programs

- (54) Head-end or distribution facility investment

- (55) General inflation, not included elsewhere

- (56) Other cost changes

- (57) Non-cost related factors

Did the factors naturally add up to your change in rates, or did you need to adjust one or more of the factors? Which factor(s) did you adjust?

4 What type of records did you use to support the calculations for the estimates of the factors in lines 52 through 57?

- 5 For which of the following reasons did you not fully understand what to submit to the FCC? Please say yes or no in response to each of the following possible reasons.
- ☐ It was unclear what some or all of the factors meant. *(Please list the unclear factors)*

 - ☐ The factors provided did not fit our company's situation
 - ☐ There were insufficient instructions or examples
 - ☐ It was unclear how to make the sum of the factors equal the change in monthly charge
 - ☐ Are there any other reasons that you did not fully understand what to submit for these factors?

- 6 How long did it take you to complete the entire FCC rates survey? How long did it take you to complete this section?
- _____

- 7 How could the FCC rates survey be improved?

Appendix III: GAO's Modifications to FCC's Competition Classification

To determine the status of competition from a wire-based competitor for our cable-satellite model, we took steps to review the accuracy of FCC's classification of effective competition for the cable franchises surveyed in 2001—the year of data used in our model. For those cases in which a finding of effective competition had been made because of the presence of a local exchange carrier (LEC) or a competitive overbuilder, we took steps to determine if that competition was still present as of 2001. For cases without a designation of effective competition, we checked to see if there was a possible LEC or overbuilder operating in the areas. This process was only designed to check the status of competition *other than* that provided by DBS. This is because we did not rely on FCC's competitive classifications related to DBS because information on DBS for our model was obtained from a different source, and we did not use FCC's classification at all in that case.

Our sample contained 705 cable franchises, of which 133 had been found to face effective competition from a LEC or overbuilder, and 572 had not. In most cases in which a finding of effective competition had been made (95 of the 133), we found evidence that, in fact, a nonsatellite provider was competing with the incumbent cable provider. In the other 38 cases, we found evidence suggesting that a nonsatellite provider was not present in 2001.¹ To make these determinations, we used various sources of information, including FCC's master list of cable franchises. We noted that if there were competitive cable franchises, we would expect to find two franchises operated by different companies in the same geographic area. If, for example, we found only one operating franchise in an area but that franchise was listed as having effective competition, we investigated further. Also, if we found two franchises operating in an area that were classified as having effective competition, but both were operated by the same company, we also investigated further. Also, in some cases, we made attempts to determine if the nonsatellite competitor was operating as an MMDS, which is sometimes referred to as wireless cable. This further investigation usually involved Web research and information obtained through contacts with local franchising authorities. In those instances for which we were able to gather information indicating that an incumbent cable provider that once faced a nonsatellite competitor no longer did in 2001, we defined our nonsatellite competition variable accordingly.

¹In the course of our review, we also identified some cable franchises that were apparently sampled because of clerical-type mistakes, such as the transposition of a franchise identification number or an inconsistency between franchises identified in the effective competition report and the franchises ultimately sampled

To check whether franchise areas without a designation of effective competition might have nonetheless faced nonsatellite competition in 2001, we used lists of service areas of cable overbuilders and compared these areas with the list of sampled franchises. We also examined FCC's master franchise list for areas in which more than one company appeared to operate an active franchise. We investigated these lists further by calling local franchising authorities to determine whether those franchise areas were geographically distinct or whether this pattern could represent competition. We also attempted to identify areas where wireless cable companies provided video service and whether any of those areas overlapped sampled franchises. In all, we found a number of cases where a nonsatellite provider appeared to be offering service in areas where no filings for effective competition had been made. In these cases, we defined our variable to reflect this competition. Of the 572 franchises without a designation of effective competition, we found that 28 were facing some form of nonsatellite competition in 2001.

Finally, we made a distinction between those franchises that were found to face effective competition because of the availability of MMDS versus areas with a wire-based overbuilder. We separated these kinds of competition into distinct variables under the assumption that they may have a differential effect on cable operators. We believed that this might be the case because many MMDS providers have been modifying their business plans and placing less emphasis on their video businesses. For example, FCC noted that "MMDS has never become a significant competitor in the market for the delivery of video programming, rather many MMDS providers are focusing on data transmission rather than video service."²

²See Federal Communications Commission, *Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, Ninth Annual Report*, FCC 02-338 (Washington, D.C. Dec. 31, 2002).

Appendix IV: Cable-Satellite Model

This appendix provides a brief description of our model of cable-satellite competition. With this model, we estimate the influence of wire-based, MMDS, and DBS competition, along with other variables, on cable prices and services through a system of structural equations in which certain variables that may be simultaneously determined are estimated jointly. The model includes equations for cable prices, the number of cable subscribers, the number of cable channels, and the DBS penetration rate. Our October 2002 report provides a more detailed discussion of the data sources, our process for merging various data into a single dataset, and the specification of our model.¹

Definitions and Sources for Variables

Table 1 includes a list of all the variables included in our model, with the definition and source identified for each variable.

Table 1: Definition and Source for Variables

Variable	Definition	Source
Cable price	The monthly rate charged for the Basic Service Tier, Cable Programming Service Tier, and rental of a converter box and remote control.	FCC 2001 Cable Rate Survey
Number of subscribers	The number of subscribers to the Basic Service Tier and Cable Programming Service Tier.	FCC 2001 Cable Rate Survey
Number of channels	The number of channels provided with the Basic Service Tier and Cable Programming Service Tier (the most commonly purchased tier).	FCC 2001 Cable Rate Survey
Direct broadcast satellite (DBS) penetration rate	The fraction of housing units in a cable franchise area that have satellite service	<i>SkyREPORT</i>
DBS provision of local stations	A binary variable that equals 1 if both DBS operators offer local broadcast stations in the cable franchise area	National Association of Broadcasters
Television market size	The number of television households in the market	Neilsen Media Research
Horizontal concentration	A binary variable that equals 1 if 1 of the 10 largest national multiple system operators (MSO) provides service in the franchise area	FCC 2001 Cable Rate Survey
Vertical relationship	A binary variable that equals 1 if the cable operator is affiliated with an MSO that has an ownership interest in a national or regional video programming service	FCC 2001 Cable Rate Survey and 2001 Annual Video Report
Presence of a wire-based competitor	A binary variable that equals 1 if a second wireline company provides cable service (including, for example, a local exchange telephone carrier offering video services) in the franchise area.	FCC 2001 Cable Rate Survey and GAO analysis

¹See GAO-03-130

Variable	Definition	Source
Presence of multichannel multipoint distribution system (MMDS) competitor	A binary variable that equals 1 if a company provides cable service via MMDS technology in the franchise area	FCC 2001 Cable Rate Survey and GAO analysis
Average wage	The average weekly wage for telecommunications equipment installers and repairers in the state where the cable franchise is located	Bureau of Labor Statistics
Population density	The ratio of population to square miles in the franchise area.	U S. Census Bureau
Number of broadcast stations	The number of over-the-air broadcast stations in the television market	BIA MEDIA AccessPro
Urbanization	The percentage of the county's population that is classified as urban by the U S. Census Bureau	U S. Census Bureau
Age of cable franchise	The number of years between when the cable franchise began operation and 2001.	FCC Master List of Cable Franchises
Homes passed by cable system	The number of homes passed by the cable system that serves the franchise area, including homes outside of the franchise area	FCC 2001 Cable Rate Survey
Median per-capita income	The median per-capita income in the franchise area.	U S. Census Bureau
System megahertz	The capacity, measured in megahertz, of the cable system that serves the franchise area.	FCC 2001 Cable Rate Survey
Percentage of multiple dwelling units	The percentage of housing units accounted for by structures with five or more housing units	U S. Census Bureau
Nonmetropolitan areas	A binary variable that equals 1 if the franchise area is outside of a metropolitan statistical area (MSA).	U S. Census Bureau
Angle (or "elevation") of satellite dish	The angle relative to the ground that a DBS subscriber must mount the satellite dish to "see" the satellite.	Web pages of DIRECTV and EchoStar
Regulation	A binary variable that equals 1 if the cable franchise is subject to regulation of the rate charged for the Basic Service Tier.	FCC 2001 Cable Rate Survey

Source: GAO (2003)

Estimation Methodology and Results

We employed the three-stage least squares method to estimate our model.² Table 2 includes the descriptive statistics for the variables included in our model, and table 3 includes the estimation results for each of the four structural equations. All of the variables, except dummy variables,³ are expressed in natural logarithmic form, so coefficients can be interpreted as *elasticities*—which is the percentage change in the value of the dependent variable associated with a 1 percent change in the value of an

²See GAO-03-130 for a discussion of why we use the three-stage least squares method, rather than the two-stage least squares method.

³A dummy variable takes a value of 1 if a certain characteristic is present and a value of 0 otherwise

independent, or explanatory, variable.⁴ The coefficients on the dummy variables are elasticities in decimal form.

Table 2: Descriptive Statistics

Variable	Mean	Standard deviation	Minimum value	Maximum value
Cable price	36.15	5.02	14.00	47.84
Cable price per channel	0.66	0.19	0.30	1.80
Cable subscribers	21,460.68	43,673.73	4.00	302,964.00
Cable channels	58.17	14.06	10.00	99.00
DBS penetration	15.91	11.31	1.59	63.64
DBS provision of local stations	0.52	0.50	0.00	1.00
Regulation	0.36	0.48	0.00	1.00
Number of broadcast stations	12.00	5.64	1.00	25.00
Median income	43,965.25	16,202.17	13,529.00	139,997.00
Horizontal concentration	0.85	0.36	0.00	1.00
Vertical relationship	0.55	0.50	0.00	1.00
Presence of wire-based competitor	0.16	0.37	0.00	1.00
Presence of MMDS competitor	0.01	0.10	0.00	1.00
Nonmetropolitan areas	0.25	0.43	0.00	1.00
Urbanization	73.53	28.12	0.00	100.00
Percentage of multiple dwelling units	14.38	13.70	0.00	98.12
Age of cable franchise	24.11	9.52	2.00	50.00
Homes passed by cable system	181,024.81	235,085.38	30.00	1,260,734.00
Cable system megahertz	638.98	172.13	216.00	870.00
Television market households	1,459.89	1,664.50	50.00	7,301.00
Population density	2,888.92	7,144.36	2.25	87,139.78
State-level wages	788.91	102.28	575.38	1,045.58
Dish angle or elevation	40.29	6.67	27.19	57.28

Source: GAO (2003).

⁴The dummy variables in the model include the following: horizontal concentration of cable systems, vertical relationship, regulation, presence of a wire-based competitor, presence of a MMDS competitor, DBS provision of local channels, and nonmetropolitan area. Also, because the natural log of 0 is undefined, we added 1 to the observed value of any continuous variable that can take the value of 0.

Table 3: Three-Stage Least Squares Model Results

Variable	Cable prices equation	Cable subscribers equation	Cable channels equation	DBS penetration equation
Cable price per channel		-1 5368 [0 0001] ^a		0 7839 [0 0001] ^a
Cable subscribers	0 0079 [0 3938]		0.0603 [0 0001] ^a	
Cable channels	0.2428 [0 0001] ^a			
DBS penetration	-0 0441 [0 0898] ^c	-2 2403 [0 0001] ^a	-0 0174 [0 5933]	
DBS provision of local stations	-0 0063 [0 7285]	0.4276 [0 0800] ^c	0.0527 [0 0408] ^b	0 3386 [0 0001] ^a
Regulation	-0 0213 [0 1157]			
Number of broadcast stations		0 5896 [0 0081] ^a		
Median income		-0 3772 [0 0813] ^c	0.0672 [0.0032] ^a	0.1903 [0 0023] ^a
Horizontal concentration	0 0528 [0 0006] ^a			
Vertical relationship	-0 0051 [0 6682]		-0 0335 [0 0351] ^b	
Presence of wire-based competitor	-0 1636 [0 0001] ^a	-1 2766 [0.0001] ^a	0 0339 [0.1832]	-0.3797 [0.0001] ^a
Presence of MMDS competitor	0 0420 [0 3697]	-0 2247 [0.7350]	0 0426 [0.5391]	-0 1350 [0 4596]
Nonmetropolitan areas				0 4456 [0.0001] ^a
Urbanization		0 0541 [0 5117]		
Percentage of multiple dwelling units			-0 0228 [0.0261] ^b	-0 2162 [0.0001] ^a
Age of cable franchise		0 3027 [0.0463] ^b		-0.1778 [0 0001] ^a
Homes passed by cable system		0 2918 [0 0001] ^a		

Appendix IV: Cable-Satellite Model

Variable	Cable prices equation	Cable subscribers equation	Cable channels equation	DBS penetration equation
Cable system megahertz			0.5038 [0.0001] ^a	-0.0434 [0.5304]
Television market households	0.0072 [0.3639]	-0.2902 [0.0670] ^c	-0.0023 [0.8489]	-0.1195 [0.0001] ^a
Population density	-0.0120 [0.0256] ^b			
State-level wages	0.0392 [0.3676]			
Dish angle or elevation				0.6028 [0.0001] ^a
Intercept	2.4077 [0.0001] ^a	14.1843 [0.0001] ^a	-0.3218 [0.3259]	0.5324 [0.5601]
Sample size	705	705	705	705

Source: GAO (2003).

Note: System-weighted R-square: 0.65. P-values are shown in square brackets.

^aSignificance at the 1 percent level.

^bSignificance at the 5 percent level.

^cSignificance at the 10 percent level.

We found that competition has an effect on the subscription video market. Competition from a second wire-based operator appears to significantly lower cable prices—cable prices were approximately 15 percent lower in areas where a second wire-based operator provides service.⁵ Yet, this competition had no effect on the quality of cable service, as measured by the number of channels the cable operator provides. Additionally, we found that higher DBS penetration rates were associated with a slight reduction in cable prices; a 10 percent higher DBS penetration rate was

⁵For dummy variables (those variables that can take a value of 0 or 1 depending on the presence of a condition (e.g., presence of wire-based competitor, DBS providers offering local broadcast stations)), we report the percentage change arising from a discrete change from 0 to 1. We calculated this percentage change as: $[\exp(\text{parameter estimate}) - 1]$ times 100.

associated with a 15 cent reduction in cable rates.⁶ In areas where both DBS operators provide local broadcast stations, we found that cable operators offer subscribers approximately 5 percent more channels than cable operators in areas where both DBS operators do not provide local stations. Unlike wire-based and DBS competition, we found that the presence of a company providing video service via MMDS technology was not associated with a different level of cable rates or number of channels provided to subscribers.⁷

We found that a variety of other factors affect the level of cable prices and the quality of cable service. Cable prices are higher in areas where the cable operator provides more channels, indicating that some consumers may be willing to pay for additional channels and that providing additional channels raises a cable company's costs. We found that cable prices were 5 percent higher when the cable operator was affiliated with 1 of the 10 largest MSOs. Finally, we found that cable operators affiliated with a cable network provided their subscribers with 3 percent fewer basic and expanded-basic cable networks than similar cable operators unaffiliated with a cable network.

DBS operators' provision of local broadcast stations is associated with significantly higher DBS penetration rates. As shown in table 3, our model results indicate that in cable franchise areas where these local stations are available from both DBS operators, the DBS penetration rate is approximately 40 percent higher than in areas where local stations are not available via satellite from both DBS operators. This finding suggests that in areas where local broadcast stations are available from both DBS operators, consumers are more likely to subscribe to DBS service; therefore, DBS appears to be more competitive with cable than in areas where local stations are not available from both DBS operators.

⁶In our October 2002 report (GAO-03-130), we did not find that DBS penetration was associated with lower cable rates. As part of our analysis for this report, we further refined our measure of competition to more accurately reflect the actual status of competition at the time our data were gathered. These refinements contributed to our finding that DBS penetration was associated with lower cable rates.

⁷In our October 2002 report (GAO-03-130), MMDS competitors were included in our variable that measured nonsatellite competition. For this report, we removed MMDS competitors from the nonsatellite competition variable, thereby creating a wire-based only competition variable, and created a separate variable for MMDS competition. We made this adjustment because (1) MMDS relies on a different technology than either wire-based or DBS competitors and (2) many MMDS operators are scaling back or discontinuing video service

Several additional factors also influence the DBS penetration rate. Our model results indicate that the DBS penetration rate is greater in nonmetropolitan areas and also tends to increase as the size of the television market decreases. Additionally, the DBS penetration rate is higher in areas that require a relatively higher angle or elevation at which the satellite dish is mounted and is lower in areas where there are more multiple dwelling units. These two factors can be associated with the need of DBS satellite dishes to “see” the satellite. That is, a dish aimed more toward the horizon (as opposed to aimed higher in the sky) is more likely to be blocked by a building or foliage, and people in multiple dwelling units often have fewer available locations to mount their dish.